DESCRIPTIONS...

INTERPHASE

During interphase, specifically G1, the cell builds up enough organelles and nutrients to share between two cells. In an animal cell, this includes replication of the centrosome to create two centrosomes. Each centrosome contains a pair of centrioles. DNA is copied, or replicated, in the S phase, for synthesis. Normally, DNA looks like a jumbled mess of what is called chromatin. When it is time to replicate the DNA, the chromatin coils up into tight lines called chromosomes. The chromosomes replicate to form sister chromatids. During G2, the cell continues to grow and create proteins for cell division.

PROPHASE

In prophase, the nucleoli disappear and the chromatin fibers coil up and, under a light microscope, are easier to distinguish as tightly folded chromosomes. The chromosomes have already been duplicated and appear as pairs of identical sister chromatids. Sister chromatids are joined near their middles at the centromere forming an "X" shape. The mitotic spindle forms in the cytoplasm from microtubules and proteins between the two centrosomes. The centrosomes begin to spread apart pushed by the growth of the microtubules.

PROMETAPHASE

The nuclear envelope breaks down allowing the microtubules to enter and attach to the chromosomes. Now, there are spindle fibers stretching from each end of the cell, or pole, toward the central equator of the cell. The fibers attach to a structure called the kinetochore located near the centromere of the sister chromatids. These fibers begin shaking the chromatids to move them toward the equator while other fibers, also microtubules but not attached to chromatids, spread out from the poles.

METAPHASE

The chromatids are now all aligned in the middle of the cell along the equator. The kinetochores on each pair of sister chromatids face opposite poles drawn by the microtubules from the pole they face.

ANAPHASE

When the sister chromatids separate from their attachment at the centromere, this is the beginning of anaphase. The sister chromatids are now called daughter chromosomes, or simply chromosomes. The attached microtubules get shorter causing the chromosomes to continue to move toward their respective poles. The non-attached microtubules of the cell begin to stretch to create more distance between the poles. At the end of anaphase, the poles each have their own equal set of chromosomes.

TELOPHASE

The nuclear envelopes reform around the poles since this is where the chromosomes have been gathered. The microtubules that did not connect to chromosomes are still stretching out to make the cell longer and ready to split. The nucleoli reform in the nuclei and the chromosomes loosen up again into chromatin.

CYTOKINESIS

Now, that the nuclei have formed in each end of the cell, the other contents needed within the cell must be split up. These contents, the nutrients and organelles in the cytoplasm, were built up for this moment during interphase and are divided up for each daughter cell's cytoplasm. In animals, cytokinesis is finished when each daughter cell has divided into their own cell.